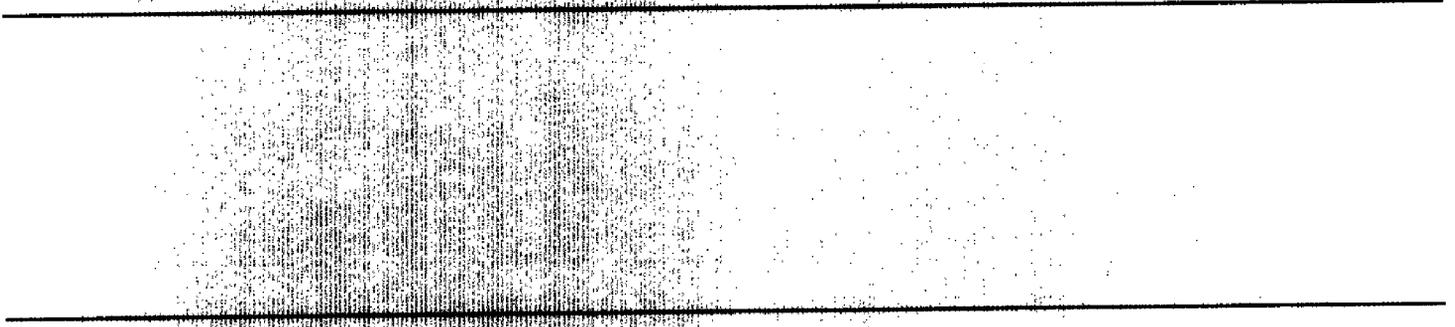


March 1994

**DEFENSE  
PRODUCTION ACT**

**Foreign Involvement  
and Materials  
Qualification in the  
Title III Program**







United States  
General Accounting Office  
Washington, D.C. 20548

151299

National Security and  
International Affairs Division

B-255662

March 14, 1994

The Honorable George J. Mitchell  
The Honorable John Glenn  
The Honorable William S. Cohen  
The Honorable Howard M. Metzenbaum  
United States Senate

The Honorable Thomas H. Andrews  
The Honorable Deborah Pryce  
House of Representatives

The United States' dependence on foreign sources for critical defense materials has been a source of concern for many years. Responding to these concerns, title III of the Defense Production Act (DPA) was reactivated in 1985.<sup>1</sup> The purpose of title III is to establish, expand, or maintain domestic production capacity for materials that are considered essential to national defense.

In response to your request, we reviewed the title III program to determine (1) the extent and nature of foreign involvement<sup>2</sup> in the title III program, Department of Defense (DOD) oversight of such involvement, and its impact on the effectiveness of the program and (2) the adequacy of DOD's efforts to qualify materials for defense weapon systems. We reviewed the title III projects awarded since 1985, all of which were in place prior to the 1992 DPA amendments.

## Results in Brief

The title III program has established and expanded domestic production capacity for materials that were considered defense critical. Since title III was reactivated 8 years ago, seven projects have been funded,<sup>3</sup> totaling approximately \$85 million in contract awards. One project was terminated early. Of the six remaining projects, two have been completed and four are still active but at various phases of completion. (App. I provides more detail about the specific projects.)

<sup>1</sup>Title III of DPA (50 U.S.C. 2091 et. seq.) was originally enacted in 1950; the act lapsed in the early 1960s. It was reactivated in 1985 and amended in 1992 by P.L. 102-558.

<sup>2</sup>In this report, foreign involvement means the direct or indirect influence of any foreign-owned company on a title III contract as a contractor, subcontractor, or as a foreign manufacturer in direct competition with a title III contractor or subcontractor.

<sup>3</sup>In March 1993, a Request for Proposal was issued for an eighth project—high purity float zone silicon. The source selection evaluation is ongoing.

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Four of the six projects have or had some foreign involvement. The impact of foreign involvement on the effectiveness of the title III program is difficult to determine because (1) three of the four projects are not yet completed and (2) none of the title III materials produced to date under these four projects is actually being used in a weapon system. This lack of use is largely because of (1) a decrease in DOD demand for the materials, especially a decrease in the number of new weapon systems entering production because of the defense drawdown and (2) the high cost of testing and qualifying them for weapons. Most of the title III contracts are not classified, which results in reduced requirements for DOD review, oversight, and approval of foreign involvement in these projects.

The title III office has identified and is implementing strategies to improve the program through more effective planning, management, and contracting strategies. Such strategies include (1) more flexible contract terms, (2) active support of material qualification efforts, and (3) involvement of more potential customers in evaluating materials. Past experience indicates that the title III program could more effectively implement these strategies so as to provide more support in qualification of title III materials and to better respond to changes in demand for such materials.

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## Background

Many statutes have contributed to the legislative foundation for defense industrial preparedness. One of these is title III of the Defense Production Act of 1950. The specific objectives of the title III program are to (1) help establish, expand, or maintain domestic production capacity that is needed for military items or systems; (2) develop industrial capacity to meet future military needs, in peace and war; and (3) accelerate the use of new materials technology. The act provides for these objectives to be achieved through direct purchases, purchase commitments, loans, loan guarantees, or grants. However, in line with a 1985 agreement between the Office of Management and Budget and DOD, the program has been restricted to purchases and purchase commitments.

Prior to 1992, the act required that for each project, the President determine and notify Congress that (1) the mineral, metal, or material<sup>4</sup> is essential to the national defense; (2) the defense demand is equal to or exceeds domestic supply; (3) the U.S. industrial base cannot be reasonably

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<sup>4</sup>Material was defined as raw materials, articles, commodities, products, supplies, components, technical information, and processes.

expected to respond to this demand; and (4) the use of title III is the best way to meet the need.

In 1992, title III was amended to provide broader and clearer direction regarding title III and made several changes to the above required presidential determination. The new language allows the use of title III authorities to expand production capacity for critical technology items, modernize domestic production capabilities, ensure reliable sources for critical items, and integrate defense and commercial production. However, the 1992 amendments were not in place for the projects we reviewed.

Besides these statutory requirements, DOD policy requires that for each title III project purchase or purchase commitment (1) the product be identified in a specification agreed to by the contractor and the government and (2) the potential capacity created by the title III project shows promise of remaining commercially viable when the purchase commitment ends.

The 1992 DPA amendments also define what constitutes a domestic source. Title III program officials told us that prior to that time, they did not have a written statutory definition of domestic source for DPA but used the term to mean a production facility located in the United States or Canada. As a result, foreign-owned but domestically located companies were not excluded from participation in title III projects. The 1992 amendments defined domestic source as a business concern that (1) performs in the United States or Canada substantially all of the research and development, engineering, manufacturing, and production activities required to fulfill a contract with the U.S. government relating to a critical component or a critical technology item and (2) procures from subcontractors that meet these same requirements. Consequently, foreign ownership still does not preclude a firm from being considered a domestic source.

The title III program operates under the direction of the Principal Deputy Assistant Secretary of Defense for Dual Use Technology Policy and International Programs. In 1986, the Air Force was designated as the executive agent for the program. The Air Force established a central program office (the title III Program Office) at Wright Patterson Air Force Base in Ohio to administer DOD's title III projects. A steering committee, assisted by a working group, provides the Principal Deputy Assistant Secretary of Defense for Dual Use Technology Policy and International Programs recommendations about policy and program direction. The committee and working group are each composed of representatives from

the Office of the Secretary of Defense (OSD), Army, Navy, Air Force, and Defense Logistics Agency.

Title III projects generally are expected to take 3 to 6 years from project award to completion and normally have two phases. Phase I, the material qualification phase, is intended to verify that the product is ready for production. This phase concentrates on verifying that the material meets the contract specifications and cost and marketing requirements and optimizes the production process. In phase II, the purchase commitment phase, DOD agrees to buy a specific quantity of material over a given time period at a prenegotiated price, if the contractor is unable to sell the material. Occasionally, three phases are involved; if so, phase II is used to scale up the production capacity established under phase I, and phase III becomes the purchase commitment phase.

In June 1993, the President sent to Congress for approval the following three new title III projects: gallium arsenide, Babington Burners, and machine tool controllers. The 60-day waiting period required by DPA elapsed without congressional comment, and the projects were approved. No contracts have been awarded yet for these projects.

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## Foreign Involvement Exists, but Its Impact Is Difficult to Assess

Since 1985, approximately \$85 million has been obligated for seven title III projects, one of which has been terminated. Of the six other title III projects, four were awarded to develop a domestic source for a specific material, while two others were for the expansion of existing domestic production capacity. Two of the six projects had direct foreign involvement; two were indirectly influenced by foreign-owned firms; and the remaining two did not have any evidence of foreign involvement.

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## Direct Involvement

Two title III projects—for discontinuous reinforced aluminum (DRA) and accelerated cooled/direct quenched (AC/DQ) steel—totaling \$34.4 million have resulted in contracts being awarded to foreign-owned, domestically located contractors or U.S. contractors with foreign subcontractors. In 1989, contracts for DRA were awarded to two domestically located contractors, one a Japanese-owned company and the other a British-owned company. These contracts are valued at \$26.9 million.

Contracts for AC/DQ steel were awarded in 1990 to three domestically owned and located companies. Each of the prime contractors entered into a subcontract with different Japanese-owned and located firms to process

the steel using AC/DQ technology needed for phase I material qualification. Manufacturing facilities did not exist in the United States or Canada, and before resources were expended to develop a domestic source, it had to be verified that AC/DQ steel would meet military service requirements. According to OSD officials, U.S. mills had only performed AC/DQ processing on a laboratory scale. The contracts specified that the foreign subcontractors would be used only during phase I. According to the title III contracting officer, \$1.98 million of the \$7.6 million for these contracts has been dedicated to the Japanese subcontractors. This project is an example of technology, in the form of process knowledge, flowing to the United States. Because DOD's demand for the material has decreased, the decision about whether to proceed into phase II will be deferred until phase I results are reviewed. In addition, OSD officials said DOD is exploring whether there is sufficient commercial demand to warrant continuation of the project. According to title III program officials, completion of phase I is scheduled for April 1994.

## Indirect Involvement

Regarding the two cases where foreign involvement indirectly affected title III projects, the program office modified one contract to allow the contractor to be more competitive in the commercial market, but did not allow such a contract modification in the other contract.

In one of its earliest projects, the program office decided not to modify the contract for the production of high purity quartz yarn. Prior to contract award, a French-owned and located company supplied DOD weapons programs with the yarn through a domestic distributor. The French company did not bid on the title III contract but, since contract award, has continued to satisfy DOD demand by building a manufacturing plant in the United States. Subsequent to the title III contract award, the French-owned company reduced the price of its quartz yarn. As a result of this and other such factors, such as reduced demand for the yarn, the title III contractor could not compete successfully with this French-owned firm and could not sell its product commercially. The contractor submitted a proposal for a contract modification. However, the title III program office denied the proposal because it was a request to do research and development to develop improved yarn sizing and OSD's position is that research and development is not permitted under title III. In addition, the contractor would not agree to commit to a contract specification. Because the French-owned plant is located in the United States, DOD considers both the foreign-owned U.S. facility and the title III contractor to be domestic sources. The title III high purity quartz yarn is not being used in a weapon

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system because of reduced demand and the competition from the foreign-owned source.

More recently, the title III program office decided to modify the contract for the graphite fiber project. In this case, a Japanese company was indirectly involved because it developed a material that was considerably stronger and more marketable than the title III project material. In order for the title III contractor to remain competitive, the program office modified the contract at no cost to the government by allowing the contractor to incorporate technology gained from a previous DOD project. According to OSD officials, unlike the quartz yarn project, research and development had already been performed and the contractor agreed to a specification change. This modification is expected to increase the fiber strength, thereby making it competitive with the Japanese fiber. The program office points to this as its evidence of efforts to reduce risk through flexible contract modifications.

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### Oversight of Foreign Involvement With Title III Projects

Most of the title III contracts are not classified, which results in reduced requirements for DOD review, oversight, and approval of foreign involvement in these projects. The title III office's involvement is limited in evaluating the eligibility of foreign companies interested in bidding on its contracts as a domestic source. When such a company wishes to bid, the title III office submits a decision worksheet with a recommendation concerning participation to the local Air Force foreign disclosure office to determine if there are any restrictions on the country represented by that company. If the local foreign disclosure office gives its approval, the title III office sends the solicitation to the foreign company. If the contract is awarded to a foreign company, standard clauses are included in the contract informing the contractor that the International Traffic in Arms Regulations must be followed.<sup>5</sup>

A company must obtain an export license through the Department of State (Office of Defense Trade Controls) in order to provide export-controlled data to a foreign parent company or any foreign national acting in the interest of that company. The U.S. Customs Service is responsible for enforcing the International Traffic in Arms Regulations.

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<sup>5</sup>These regulations provide the control requirements for export and import of defense articles and services by U.S. and foreign entities in the United States.

## Impact of Foreign Involvement Difficult to Determine

The impact of direct or indirect foreign involvement in title III projects is difficult to determine because (1) three of the four projects are not yet completed and (2) none of the title III materials produced to date under these four projects is actually being used on a weapon system. The question of impact is also complicated by the definition of domestic source, as previously discussed. Although the definition does not exclude foreign-owned, but domestically located firms from participating in the program, various officials (a title III contractor, a technical sponsor,<sup>6</sup> and Office of Foreign Disclosure officials) expressed concerns about possible technology transfers to foreign-owned title III contractors. They questioned the safeguarding of the technology, especially concerning those contracts with direct foreign involvement, but acknowledged that they knew of no indication that such transfers took place on any title III projects. According to the title III program office (1) title III contracts are screened prior to award to ensure that they require the contractors to safeguard the technology and (2) program officials have a responsibility to report any indications of suspected technology transfer, above and beyond the contractors' responsibilities. No such reports have been made.

## Weapon System Qualification Is Difficult

Due to defense downsizing, budget cuts, and the reduced military threat, DOD is building fewer new weapon systems. As a result, most projected demand estimates for title III materials have been reduced. Also, it is often difficult to find weapons program offices willing to invest already scarce funds to qualify title III materials for use in existing systems. The title III office is working to find additional military and commercial uses for materials produced under title III contracts. According to program officials, a potential market is for state-of-the-art replacement materials for existing weapon systems. Title III officials are exploring this retrofit market, but the cost of qualification testing remains a concern for weapons program managers.

There are three main methods of testing, or qualifying, materials for use in weapon systems that may be applied after a title III contractor has demonstrated material production capacity.

- **Material qualification.** This occurs when a material meets requirements set forth in a DOD contract. This is the least expensive level of qualification, and the materials generally must meet other standards to be used in a weapon system.

<sup>6</sup>The technical sponsor is the individual who has been designated by the principal military service or other defense component to provide technical support, advocacy, and oversight of a project from proposal development through initial structuring to contract closeout.

- **Design allowable testing.** This entails significant testing to demonstrate that the material exhibits certain chemical, physical, and electrical properties. OSD officials stated that not all title III materials are appropriate for this type of qualification. Materials meeting these standards are placed in listings, such as MIL Handbook 5, used by defense contractors to identify potential materials. Such listing is not required for, and does not guarantee, use in a DOD weapon system, but often enhances a material's market viability.
- **System qualification.** This entails testing the material as a fabricated part or component to determine if it meets specific weapon system requirements. It is the most costly type of qualification. However, even successful system qualification does not guarantee a viable market.

### Early Qualification Process Successful, but Ultimate Goal Not Achieved

Five of the six projects have met the material qualification standards, as set forth in the title III contracts. The sixth project has not met material qualification standards because the project has not completed phase I, but title III officials are optimistic that the standards will be met.

One of the five projects that met the material qualification standards is currently being considered for weapon system use. In this case, Warner Robins Air Force Base officials have decided to use the DRA project materials in the C-141 #2 emergency escape hatch, if the material can successfully be processed into an end item. The Ogden Air Logistics Center is also qualifying the DRA project materials in the F-16 vertical fin. After coordinating with the title III office, the contractor for the DRA project contacted Warner Robins officials to find possible uses for its material. According to title III officials, their office is attempting to qualify its other materials in a similar manner. Materials produced under the remaining four projects, although being evaluated for various retrofit/new applications, are not currently being used in weapon systems. However, according to a title III program official, the technology from the title III traveling wave tube project is now being used in the manufacture of traveling wave tubes for other systems.

To date, none of the title III materials have completed design-allowable testing. The title III Working Group and Air Force Headquarters have given approval to the title III office to finance up to \$3 million toward design-allowable testing for the two contractors in the DRA project. This is the first time the title III office has been given the authority to fund such testing.

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The title III traveling wave tube project is the only project that has achieved system qualification. In this project, the tubes were qualified, purchased, and provided to the Navy for use in the Airborne Self-Protection Jammer. However, the jammer program has since been canceled.

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### Cost and Demand Problems Encountered

The 1992 DPA amendments provided that the cost of qualifying title III material is to be borne by the department or agency imposing the qualification requirement. OSD interprets this provision to mean that whichever DOD office or program requires system qualification testing of a title III material is responsible for the testing cost.<sup>7</sup> Previously, it was unclear whether the costs of design-allowable and system qualification tests were the responsibility of the contractor or the weapon system or title III program offices.

For weapon systems that have completed system qualification, the program offices and contractors have already identified suppliers and are reluctant to spend additional funds to qualify new materials unless there is some benefit to the programs. To facilitate acceptance of its materials, the title III office provides material samples from the projects to a variety of industry and DOD users for testing and evaluation in exchange for the test results.

As previously mentioned, it takes several years to complete a title III project. For the projects already undertaken, it took an average of 39 months from contract start to material qualification (end of phase I). Only one project has completed phase II; the other projects are in varying stages of completion. As the projects mature, the demand for the original material may change. For example, we found that the demand decreased for four of six projects.

- In the traveling wave tube project, the title III office paid \$3.3 million to contractors for all 90 tubes produced to specifications. These tubes were originally developed for use in the Airborne Self-Protection Jammer System, but the system was canceled. Tubes that were not provided for system testing are now in storage at a Navy facility in Crane, Indiana, for use as spares on jammers that were already produced or, according to the program office, for new systems if the jammer program is reinstated.

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<sup>7</sup>According to title III office and OSD officials, the DPA provision will be implemented through a new Defense Federal Acquisition Regulation Supplement clause, which is being developed.

- In the graphite fiber project, the title III office paid about \$2.2 million for 4,581 (65 percent) of the 7,000 pounds of fiber produced during the first and second years of the phase II purchase commitment. Of the 4,581 pounds, almost 2,500 was sent to potential users for test and evaluation purposes, and the remainder is stored at the contractor's facility. The title III office modified the contract in the third year of the purchase commitment (July 1992) to incorporate technology advances from another DOD project. The demand for the fiber produced under the original contract changed to a higher strength fiber. According to the project director, this new fiber has recently been manufactured and shipped to the technical sponsor.
- For the high purity quartz yarn project, the title III office paid \$8.9 million to the contractor for 59,862 pounds of yarn, or 99.8 percent of the 60,000 pounds total produced. This material was produced using a Teflon finish. There were indications early in the project that the market for Teflon finish was drying up and that other finishes were more acceptable, but the contract was never modified to meet the existing demand. According to program officials, the contract was not modified because the contractor wanted the government to do something that OSD believes is not authorized under title III: fund the research and development of a better sizing to improve handling characteristics. When production was completed, neither the contractor nor the title III office could find anyone to use the new yarn, which is currently stored at a DOD facility. Recently, the technical sponsor and the title III marketing manager have identified potential markets for high purity quartz yarn with and without the Teflon finish.
- In the AC/DQ steel project, the title III office is in the process of evaluating how to respond to the decrease in product demand. At the time the phase I contract was awarded, DOD's projected demand for AC/DQ steels was higher than the current projected demand. The title III office is deferring the decision on phase II until completion of phase I and review of its results. Additionally, DOD is exploring whether sufficient commercial demand warrants continuation of the project.

## DOD Strategies to Reduce Project Risk

DOD's fiscal year 1992 report on the DPA title III program identified several specific strategies the program office planned to implement to reduce project risk. These strategies were to improve the program through more effective planning, management, and contracting actions and included the following:

- 
- more flexible contract terms so material specifications, quantities, and prices can be adjusted as circumstances change;
  - active support of contractor efforts to qualify title III materials for the broadest possible number of defense and commercial programs; and
  - involvement of as many potential customers as possible in evaluating materials and providing feedback.

As previously discussed, the experience of the last several years indicates that (1) the title III program materials have been underutilized, (2) DOD did not consistently monitor supply and demand for program materials so that it could promptly respond to changes in demand for its materials, (3) DOD did not always use flexible contract terms, and (4) DOD had difficulty qualifying title III program materials for use. According to title III officials, the title III program office, in coordination with the project sponsors, has focused mostly on material qualification (phase I), but recently has also addressed design-allowable testing.

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## Recommendations

Although there are indications that the title III program has become more flexible in adjusting to changing market conditions, we recommend that the Secretary of Defense take steps to ensure that the Principal Deputy Assistant Secretary of Defense for Dual Use Technology Policy and International Programs follow through on the strategies identified in DOD's fiscal year 1992 report on the program. In particular, this should include

- using more flexible contract terms and monitoring supply and demand of materials on a continuing basis so that market changes can be reacted to in a timely fashion and
- considering funding for design-allowable testing efforts on other projects, as was the case for the DRA project, and actively supporting contractor efforts to qualify title III materials and involving as many potential customers as possible in evaluating such materials by continuing its recent efforts to qualify materials for projects besides DRA.

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## Agency Comments

In commenting on a draft of this report, DOD fully concurred with its findings and recommendations. DOD agreed that there is a need to ensure (1) title III contract terms are utilized that permit flexibility during the life cycle of a project and (2) that funding for design allowable testing is used where applicable. DOD has developed planned actions to address each of these matters. DOD's comments are provided in appendix II.

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## Scope and Methodology

We obtained information on the project contracts and management of the title III program by reviewing the contract files and interviewing officials at the following offices at Wright Patterson Air Force Base, Ohio:

- Directorate of Manufacturing Technology (the Title III Program Office),
- Wright Aeronautical Laboratory, and
- Air Force Office of Foreign Disclosure.

We also obtained information from the following contractors:

- Fiber Materials Incorporated (FMI), Acton, Massachusetts;
- Fiber Materials Incorporated, Columbus, Ohio;
- Quartz Products Company, Louisville, Kentucky;
- Advanced Composite Materials Corporation (ACMC), Greer, South Carolina;
- AMOCO Performance Products, Inc., Greenville, South Carolina;
- Lukens Steel Company, Coatesville, Pennsylvania;
- Bethlehem Steel Corporation, Bethlehem, Pennsylvania; and
- Union Carbide Corporation, Washougal, Washington.

We interviewed officials in the Office of the Principal Deputy Assistant Secretary of Defense for Dual Use Technology Policy and International Programs to obtain their views on the implementation of the act and the 1992 amendments to the act. We also visited and interviewed officials at General Electric Aircraft Engines in Cincinnati, Ohio, and Warner Robins Air Force Base, Georgia, to obtain their views on the qualification of title III materials.

We conducted our review between January 1993 and September 1993 in accordance with generally accepted government auditing standards.

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Unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from its issue date. At that time, we will send copies to the Secretary of Defense, the Secretary of the Air Force, and other interested congressional committees. Copies of this report will also be made available to others upon request.

Please contact me at (202) 512-4587 if you or your staff have any questions concerning this report. Major contributors to this report are listed in appendix III.

A handwritten signature in black ink, appearing to read "David E. Cooper". The signature is fluid and cursive, with the first name "David" being the most prominent.

David E. Cooper  
Director, Acquisition Policy, Technology,  
and Competitiveness Issues

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## Abbreviations

AC/DQ	accelerated cooled/direct quenched
ACMC	Advanced Composite Materials Corporation
BOD	Department of Defense
DPA	Defense Production Act
DRA	discontinuous reinforced aluminum
FMI	Fiber Materials Incorporated
OSD	Office of the Secretary of Defense

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# Status of Projects

Dollars in millions

Projects	Contractors (contract award date)	Contract amount	Status	Material qualified for use in a weapon system
Accelerated cooled direct quenched steels	Bethlehem Steel Corporation and	\$3.12	Ending phase I	No
	United States Steel/Lukens (5/90)	\$4.46		
High-modulus pitch-based graphite yarns	AMOCO (7/88)	\$7.88	Phase II material met specifications only	No
Discontinuous silicon-carbide reinforced aluminum	ACMC (high strength) and	\$17.79	Phase II material met specifications and being tested for MIL Handbook 5	Currently being considered for the C-141 #2 emergency escape hatch and the F-16 vertical fin
	DWA Composites Specialties, Inc. (moderate strength) (9/89)	\$9.12		
High-purity quartz yarns	FMI (9/88)	\$11.48	Completed - 2/92 material met specifications only	No
Silicon-on-insulator/ silicon-on-sapphire wafers	Union Carbide (9/88)	\$23.39	Material met specifications	No
High-power, wide-band traveling wave tubes	Litton Systems, Inc.	\$1.55	Completed - 5/93 system qualified for the Airborne Self-Protection Jammer	Yes <sup>b</sup>
	Raytheon Company	\$0.95 <sup>a</sup>		No
	Teledyne MEC	\$1.73		Yes <sup>b</sup>
	Varian Associates, Inc. (9/87)	\$1.79 <sup>a</sup>		No
Intrinsically pure polysilicon <sup>c</sup>	Hemlock (9/87)	\$1.43	Terminated - 7/89	No

<sup>a</sup>This contract was terminated early.

<sup>b</sup>The Airborne Self-Protection Jammer System for which the tubes were developed was canceled.

<sup>c</sup>This contract was terminated due to contractor inability to produce material during phase I; therefore, we did not review the project.

# Comments From the Department of Defense



ECONOMIC SECURITY

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE  
3300 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3300



3 FEB 1994

Mr. Frank C. Conahan  
Assistant Comptroller General  
National Security and International  
Affairs Division  
U.S. General Accounting Office  
Washington, DC 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, entitled—"DEFENSE PRODUCTION ACT: Foreign Involvement and Materials Qualification in the Title III Program," dated December 16, 1993, (GAO Code 396053), OSD Case 9534. The Department concurs with the report.

The DoD agrees that there is a need to ensure Title III contract terms are utilized that permit flexibility during the life cycle of a project and changing market conditions are monitored to ensure timely reaction to supply and demand. The DoD also agrees that there is a need to ensure that funding for design allowable testing is utilized where applicable and support of Title III contractors' efforts to qualify and evaluate materials and involve as many of the potential customers as possible in the evaluation process. The DoD has developed planned actions to address each of these matters.

The detailed DoD comments on the report findings and recommendations are provided in the enclosure. The Department appreciates the opportunity to comment on the draft report.

Sincerely,

Walter B. Bergmann, IA  
Acting Deputy Assistant Secretary  
(Production Resources)

Enclosure



GAO DRAFT REPORT - DATED DECEMBER 16, 1993  
(GAO CODE 396053) OSD CASE 9534

"DEFENSE PRODUCTION ACT: FOREIGN INVOLVEMENT AND MATERIALS  
QUALIFICATION IN THE TITLE III PROGRAM"

DEPARTMENT OF DEFENSE COMMENTS

\* \* \* \* \*

FINDINGS

- o **FINDING A: Defense Industrial Preparedness.** The GAO observed that many statutes have contributed to the legislative foundation for Defense industrial preparedness; with one of them being Title III of the Defense Production Act of 1950. The GAO explained that the specific objectives of the Title III program are to (1) help establish, expand, or maintain domestic production capacity that is needed for military items or systems, (2) develop industrial capacity to meet future military needs, in peace and war; and (3) accelerate the use of new materials technology. The GAO noted that the Act provides for the objectives to be achieved through direct purchases, purchase commitments, loans, loan guarantees, or grants. The GAO further noted, however, that in line with a 1985 agreement between the Office of Management and Budget and the DoD, the program had been restricted to purchases and purchase commitments.

The GAO reported that, in 1992, Title III was amended to provide broader and clearer direction. The GAO noted that the new language allowed the use of Title III authorities to expand production capacity for critical technology items, modernize domestic production capabilities, ensure reliable sources for critical items, and integrate Defense and commercial production.

The GAO stated DoD policy requires that, for each Title III project purchase or purchase commitment--(1) the product be identified in a specification agreed to by the contractor and the Government and (2) the potential capacity created by the Title III project show promise of remaining commercially viable when the purchase commitment ends. The GAO noted that Title III projects generally are expected to take 3 to 6 years from project award to completion and normally have two phases-

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ENCLOSURE

Appendix II  
Comments From the Department of Defense

(1) Phase I is the material qualification phase, which is intended to verify that the product is ready for production, concentrates on verifying that the material meets the contract specifications and cost and marketing requirements and optimizes the production process. Phase II is the purchase commitment phase, in which the DoD agrees to buy a specific quantity of material over a given time period at a pre-negotiated price--if the contractor is unable to sell the material. The GAO further noted that, occasionally, three phases are involved--if so, phase II is used to scale up the production capacity established under phase I, and phase III becomes the purchase commitment phase.

The GAO reported that, in June 1993, the President sent to the Congress for approval three new Title III projects-- (1) gallium arsenide, (2) Babington Burners, and (3) machine tool controllers. The GAO noted that the 60-day waiting period required by the Defense Production Act elapsed without congressional comment--and the projects were approved; however, no contracts had been awarded. (pp. 3-6/GAO Draft Report)

**DOD RESPONSE:** Concur.

- o **FINDING B: Direct Involvement.** The GAO explained that two Title III projects--for Discontinuous Reinforced Aluminum and Accelerated Cooled/Direct Quenched steel-- totaling \$34.4 million--had resulted in contracts being awarded to foreign-owned, domestically located contractors or U.S. contractors with foreign subcontractors. The GAO further noted that, in 1989, contracts for Discontinuous Reinforced Aluminum totaling \$23.8 million were awarded to two domestically located contractors--one a Japanese-owned company and the other a British-owned company. The GAO noted that those contracts are valued at \$26.9 million.

The GAO further explained that contracts for Accelerated Cooled/Direct Quenched steel were awarded in 1990 to three domestically owned and located companies. The GAO noted that each of the prime contractors entered into a subcontract with different Japanese-owned and located firms to process the steel using Accelerated Cooled/Direct Quenched steel technology needed for Phase I material qualification. The GAO further noted that manufacturing facilities did not exist in the United States or Canada and before resources were expended to develop a domestic source it had to be verified that Accelerated Cooled/Direct Quenched steel would meet Military Service requirements. According to the GAO, DoD officials advised that United States mills had only performed Accelerated Cooled/Direct Quenched processing on a laboratory scale. The GAO pointed out that the contracts

Now on pp. 2-4.

Now on pp. 4-5.

specified that the foreign subcontractors would be used only during phase I. The GAO also indicated that, according to the Title III contracting officer, \$1.98 million of the \$7.6 million for the contracts had been dedicated to the Japanese subcontractors. The GAO pointed out that the project is an example of technology, in the form of process knowledge, flowing to the United States. The GAO observed that, because the DoD demand for the material has decreased, the decision on whether to proceed into phase II will be deferred until phase I results are reviewed. The GAO indicated that, according to DoD officials, the Department is exploring whether there is sufficient commercial demand to warrant continuation of the project. (pp. 7-8/GAO Draft Report)

**DOD RESPONSE:** Concur.

- o **FINDING C: Indirect Involvement.** The GAO reported that there were two cases where foreign involvement indirectly affected Title III projects. The GAO found that the program office modified one contract to allow the contractor to be more competitive in the commercial market, but did not allow a contract modification in the other contract.

The GAO noted that, prior to contract award, a French-owned and located company supplied the DoD weapons programs with the yarn through a domestic distributor. The GAO pointed out that the French company did not bid on the Title III contract but, since contract award, had continued to satisfy the DoD demand by building a manufacturing plant in the United States. The GAO further pointed out that, subsequent to the Title III contract award, the French-owned company reduced the price of its quartz yarn. The GAO concluded that, as a result of the French-owned company involvement and the reduced demand for the yarn, the Title III contractor could not compete successfully with the French-owned firm and could not sell its product commercially. The GAO learned that the contractor submitted a proposal for a contract modification, but it was denied by the Title III program office because (1) it was a request to do research and development to develop improved yarn sizing and (2) it is the position of the DoD that research and development was not permitted under Title III. The GAO further learned that the contractor would not agree to commit to a contract specification. According to the GAO, because the French-owned plant is located in the U.S., the DoD considers both the foreign-owned U.S. facility and the Title III contractor to be domestic sources. The GAO further noted that the Title III high purity quartz yarn is not being used in a weapon system because of reduced demand and the competition from the foreign-owned source.

The GAO found that a decision was made by the Title III program office to modify the contract for the graphite fiber project. The GAO noted a Japanese company was indirectly involved because it developed a material that was considerably stronger and more marketable than the Title III project material. According to the GAO, in order for the Title III contractor to remain competitive, the program office modified the contract at no cost to the Government by allowing the contractor to incorporate the technology gained from a previous DoD project. The GAO also stated that, according to DoD officials, unlike the quartz yarn project, the research and development had already been performed and the contractor agreed to a specification change. The GAO also noted that the modification is expected to increase the fiber strength--thereby making it competitive with the Japanese fiber. (pp. 8-9/GAO Draft report)

Now on pp. 5-6.

**DOD RESPONSE:** Concur.

- o **FINDING D: Oversight of Foreign Involvement With Title III Projects.** The GAO reported that most of the Title III contracts are not classified, which results in reduced requirements for the DoD review, oversight, and approval of foreign involvement. The GAO noted that the Title III office involvement is limited in evaluating the eligibility of foreign companies interested in bidding on contracts as a domestic source. The GAO further reported that a company must obtain an export license through the Department of State (Office of Defense Trade Controls) in order to provide export-controlled data to a foreign parent company or any foreign national acting in the interest of that company. The GAO also noted that the U.S. Customs Service is responsible for enforcing the International Traffic in Arms Regulations. (p. 10/GAO Draft Report)

Now on p. 6.

**DOD RESPONSE:** Concur.

- o **FINDING E: Impact of Foreign Involvement Difficult to Determine.** The GAO reported that the impact of direct or indirect foreign involvement in Title III projects is difficult to determine because (1) three of the four projects are not yet completed and (2) none of the Title III materials produced to date under the four projects is actually being used on a weapon system. Noting the definition of domestic source does not exclude foreign-owned, but domestically located firms from participating in the program, the GAO indicated that various officials (a Title III contractor, a technical sponsor, and officials of the Office of Foreign Disclosure) expressed concerns about possible technology transfers to foreign-owned Title III

Now on p. 7.

contractors. According to the GAO, the officials questioned the safeguarding of the technology--especially concerning contracts with direct foreign involvement--but acknowledged they knew of no indication such transfers took place on any Title III projects. The GAO pointed out that, even though Title III contracts are screened prior to award to insure that they require the contractors to safeguard the technology, program officials have a responsibility to report any indications of suspected technology transfer, above and beyond the contractors' responsibilities; however no such reports had been made. (p. 11/GAO Draft Report)

**DOD RESPONSE:** Concur.

- o **FINDING F: Weapon System Qualification Is Difficult.** The GAO observed that, due to Defense downsizing, budget cuts, and reduced military threat, the DoD is building fewer new weapon systems. The GAO noted that, as a result, most projected demand estimates for Title III materials have been reduced. The GAO further noted that it is often difficult to find weapons program offices willing to invest already scarce funds to qualify Title III materials for use in existing systems--although the Title III office is working to find additional military and commercial uses for materials produced under Title III contracts. The GAO reported that, according to program officials, a potential market is for state-of-the-art replacement materials for existing weapon systems. The GAO also reported that title III officials are exploring the retrofit market, but the cost of qualification testing remains a concern for weapons program managers.

The GAO found there are three main methods of testing or qualifying materials for use in weapon systems that may be applied after a Title III contractor has demonstrated material production capacity:

- **Material Qualification**--The GAO noted that material qualification occurs when a material meets requirements set forth in a DoD contract. The GAO noted that this is the least expensive level of qualification, and the materials generally must meet other standards to be used in a weapon system.
- **Design Allowable Testing**--The GAO noted that design allowable qualification entails significant testing to demonstrate that the material exhibits certain chemical, physical, and electrical properties. The GAO pointed out that, according to DoD officials, not all

Title III materials are appropriate for that type of qualification. The GAO observed that materials meeting the standards are placed in listings used by defense contractors to identify potential materials. The GAO also noted that such listing is not required for, and does not guarantee, use in a DoD weapon system, but often enhances a material's market viability.

- System Qualification--The GAO noted that system qualification entails testing the material, as a fabricated part or component, to determine if it meets specific weapon system requirements. The GAO pointed out that it is the most costly type of qualification; but even successful system qualification does not guarantee a viable market. (pp. 12-13/GAO Draft Report)

Now on pp. 7-8.

DOD RESPONSE: Concur.

- o FINDING G: Early Qualification Process Successful, But Ultimate Goal Not Achieved. The GAO found that five of the six Title III projects had met the material qualification standards, as set forth in the Title III contracts. The GAO noted that the sixth project had not yet met material qualification standards because the project had not completed phase I; however, Title III officials are optimistic that the standards will be met.

The GAO explained that one of the five projects that met the material qualification standards is currently being considered for weapon system use. The GAO pointed out that, in that case, Warner Robins Air Force Base officials had decided to use the Discontinuous Reinforced Aluminum project materials in the C-141 #2 Emergency Escape Hatch--if the material can be successfully processed into an end item. The GAO noted that the Ogden Air Logistics Center is also qualifying the Discontinuous Reinforced Aluminum project materials in the F-16 vertical fin. The GAO further noted that materials produced under the remaining four projects, although being evaluated for various retrofit/new applications, are not currently being used in weapon systems. The GAO indicated that a Title III program official advised that the technology from the Title III traveling wave tube project is now being used in the manufacture of traveling wave tubes for other systems.

The GAO explained that, to date, none of the Title III materials have completed design allowable testing. The GAO further explained that the Title III Working Group and Air Force Headquarters had given approval to the Title III

Now on pp. 8-9.

office to finance up to \$3 million toward design allowable qualification for the two contractors in the Discontinuous Reinforced Aluminum project. The GAO pointed out that is the first time the Title III office had been given authority to fund design allowable testing. The GAO also reported the Title III Traveling Wave Tube project is the only project that had achieved system qualification. The GAO pointed out that, in the project, the tubes were qualified, purchased, and provided to the Navy for use in the Airborne Self-Protection Jammer. The GAO reported, however, that the jammer program had since been canceled. (pp. 13-14/GAO Draft Report)

**DOD RESPONSE:** Concur. The report provides a clear synopsis of the difficulties that have been experienced in qualifying Title III materials in defense systems. The defense draw-down which has caused program terminations and reduced the number of new systems entering production and the difficulties of qualifying materials for systems already in production, has limited the opportunities for materials produced under previous or existing Title III contracts to be used in new systems. Additionally, with the broadening of the Act by the 1992 amendments, commercial demand can be considered in relation to military demand, thereby fostering the ability to undertake dual-use Title III projects. Moreover, Title III materials are finding their way into a growing number of products. While most are not DoD applications, they serve to ensure that the production capability established by the Title III Program remains in place and available for future Defense applications. Examples of defense and commercial applications include:

- High-Power, Wide-Band Traveling Wave Tubes: Tubes produced and not used for system testing under Title III are in storage and will be used as spares in Airborne Self-Protection Jammers, or if the program is activated, in new production. Production capacity established under Title III has been used to produce tubes that are currently operating in systems. The capacity remains available for any future defense requirements.
- High Modulus Pitch-Based Graphite Yarns: The material is being used in General Electric's A2100 satellite and earth observing satellite, by Kodak for various space applications, and by Hughes to produce two satellites for Brazil. In addition, Boeing is using the material in its new engine for commercial aircraft which will be entering production shortly.

- Discontinuous Silicon Carbide Reinforced Aluminum: In addition to the C-141 escape hatch and the F-16 ventral fin applications discussed in the report, Discontinuous Reinforced Aluminum has been used by Lockheed for electronic racking, and is being road tested for use on commercial bicycles.

- o **FINDING E: Cost and Demand Problems Encountered.** The GAO reported the 1992 Defense Production Act amendments provided that the cost of qualifying Title III material is to be borne by the department or agency imposing the qualification requirement. The GAO indicated that the DoD interprets the provision to mean that whichever DoD office or program requires system qualification testing of a Title III material is responsible for the cost of the testing. The GAO pointed out that, previously, it was unclear whether the costs of design allowable and system qualification tests were the responsibility of the weapons system or Title III program offices, or the contractor.

The GAO reported that, for weapon systems having completed system qualification, the program offices and contractors have already identified suppliers and are reluctant to spend additional funds to qualify new materials, unless there is some benefit to the programs. The GAO noted that, to facilitate acceptance of materials, the Title III office provides material samples from the projects to a variety of industry and DoD users for testing and evaluation in exchange for the test results.

The GAO asserted that it takes several years to complete a Title III project. The GAO explained that for the projects already undertaken, an average of 39 months was needed from contract start to material qualification. The GAO further noted that only one project has completed phase II; with the other projects in varying stages of completion. The GAO pointed out that, as the projects mature, the demand for the original material may change. The GAO found that the demand decreased for four of six projects:

- The GAO noted that, in the traveling wave tube project, the Title III office paid \$3.3 million to contractors for all 90 tubes produced to specifications. The GAO explained that the tubes were originally developed for use in the Airborne Self Protection Jammer System, but the system was canceled and no other military or commercial application is available for the tubes. According to the GAO, the Title III program office indicated that tubes that were not provided for system testing are now in storage at a Navy facility

Appendix II  
Comments From the Department of Defense

in Crane, Indiana, for use as spares on jammers that already were produced or, for new systems, if the jammer program is reinstated.

- The GAO further noted that, in the graphite fiber project, the Title III office paid about \$2.2 million for 4,581 (65 percent) of the 7,000 pounds of fiber produced during the first and second year of the Phase II purchase commitment. According to the GAO, of the 4,581 pounds, almost 2,500 was sent to potential users for test and evaluation purposes and the remainder is stored at the contractor's facility. The GAO indicated that the Title III office modified the contract in the third year of the purchase commitment (July 1992) to incorporate technology advances from a DoD Manufacturing Technology project--and that the demand for the fiber produced under the original contract changed to a higher strength fiber. The GAO reported that, according to the project director, the new fiber had recently been manufactured and will be delivered to the Title III office in February 1994.
- The GAO also noted that, for the high purity quartz yarn project, the Title III office paid \$8.9 million to the contractor for 59,862 pounds of yarn--or 99.8 percent of the total of 60,000 pounds produced. The GAO explained that the material was produced using a Teflon finish. The GAO learned that there were indications early in the project that the market for Teflon finish was drying up and that other finishes were more acceptable, but the contract was never modified to meet the existing demand. The GAO indicated that the contract was not modified because the contractor wanted the Government to do something that DoD believes was not authorized under Title III--fund the research and development of a better sizing to improve handling characteristics. The GAO noted, however, that when production was completed, neither the contractor nor the Title III office could find anyone to use the new yarn, which is currently stored at a DoD facility--but, recently, the technical sponsor and the Title III marketing manager had identified potential markets for high purity quartz yarn with and without the Teflon finish.

Appendix II  
Comments From the Department of Defense

- In addition, the GAO noted that in the Accelerated Cooled/Direct Quenched steel project, the Title III office is in the process of evaluating how to respond to the decrease in product demand. The GAO pointed out that, at the time the phase I contract was awarded, the DoD projected demand for Accelerated Cooled/Direct Quenched steels was higher than the current projected demand. The GAO further noted that the Title III office is deferring the decision on phase II until completion of phase I and a review of its results. The GAO pointed out that the DoD also is exploring whether sufficient commercial demand warrants continuing the project. (pp. 14-17/GAO Draft Report)

Now on pp. 9-10.

**DOD RESPONSE:** Concur.

- o **FINDING I: The DoD Strategies to Reduce Project Risk.** The GAO found that the DoD FY 1992 report on the Defense Production Act Title III program identified several specific strategies the program office planned to implement to reduce project risk. The GAO noted that the strategies were to improve the program through more effective planning, management, and contracting actions and included:

- more flexible contract terms so material specifications, quantities, and prices can be adjusted as circumstances change;
- active support of contractor efforts to qualify Title III materials for the broadest possible number of Defense and commercial programs; and
- involvement of as many potential customers as possible in evaluating materials and providing feedback.

The GAO concluded that the experience of the last several years indicates that (1) the Title III program materials have been under used, (2) the DoD did not consistently monitor supply and demand for program materials to permit prompt response to changes in demand for materials, (3) the DoD did not always use flexible contract terms, and (4) the DoD had difficulty qualifying Title III program materials for use. According to the GAO, the Title III program office, in coordination with the project sponsors, focused mostly on material qualification (phase I), but recently had also addressed design allowable testing. (pp. 17-18/GAO Draft Report)

Now on pp. 10-11.

**DOD RESPONSE:** Concur.

**RECOMMENDATIONS**

- o **RECOMMENDATION 1:** The GAO recommended that the Secretary of Defense take steps to ensure the Principal Deputy Assistant Secretary of Defense for Dual Use Technology Policy and International Programs follows through on the strategies identified in the DoD FY 1992 report on the program--to include (a) using more flexible contract terms and (b) monitoring supply and demand of materials on a continuing basis so that market changes can be reacted to in a timely fashion. (pp. 18-19/GAO Draft Report)

**DOD RESPONSE:** Concur. The Department has developed and will continue to develop contract terms that permit flexibility during the life of a project to allow the contractor to meet changing market conditions. Increased emphasis is being placed on early identification of changing market conditions to permit timely modifications to the project. The DoD is also conducting a review of existing incentives contained in the Defense Production Act that would provide contracting alternatives and increased flexibility. Procurement strategies are reviewed on a project by project basis during quarterly Title III Working Group meetings.

Specific planned actions include the following:

- By March 1994, the Office of the Secretary of Defense will forward a memorandum to the Title III Program Office emphasizing the need to implement the GAO recommended actions.
- By April 1994, a review will be performed of Defense Production Act authorities.
- By December 1994, specific procedures will be included in proposed Title III internal operating instructions to implement the GAO recommended actions.
- On a quarterly basis, Title III Working Group meetings will be held to monitor implementation on a project-by-project basis.

Now on p. 11.

- o **RECOMMENDATION 2:** The GAO recommended that the Secretary of Defense take steps to ensure that the Principal Deputy Assistant Secretary of Defense for Dual Use Technology Policy and International Programs follows through on the strategies identified in the DoD FY 1992 report on the program—to include (a) considering funding for design allowable testing efforts on other projects, as was the case for the Discontinuous Reinforced Aluminum project and (b) actively supporting contractor efforts to qualify Title III materials and involving as many potential customers as possible in evaluating such materials by continuing recent efforts to qualify materials for projects besides Discontinuous Reinforced Aluminum. (pp. 18-19/GAO Draft Report)

Now on p. 11.

**DOD RESPONSE:** Concur. The Department is actively supporting efforts to qualify and evaluate materials for various applications and, where applicable, will fund design allowable testing. The Title III Program has been actively following the GAO recommended actions on both the Silicon-On-Sapphire and High Modulus Pitch-Based Graphite Fiber projects. Potential customer involvement is also being emphasized on new programs, including the recently awarded High Purity Single Crystal Silicon project and the Gallium Arsenide Wafer project planned for award later this year. The recommended actions will be institutionalized in Title III operating procedures and monitored on a project by project basis by the Title III Working Group.

Specific planned actions include the following:

- By March 1994, the Office of the Secretary of Defense will forward a memorandum to the Title III Program Office emphasizing the need to implement the GAO recommended actions.
- By December 1994, specific procedures will be included in the proposed Title III Manual to implement the GAO recommended actions.
- On a quarterly basis, Title III Working Group meetings will be held to monitor implementation on a project-by-project basis.

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